bigQ – Annual highlights 2022

Quantum Key Distribution

The race for information security is an ever ongoing one, and cryptography schemes must constantly be developed in order to protect against the rapidly growing speed of computers. In addition to the threat from ordinary computers, there is an entirely new threat lurking in the future from quantum computers as they will be able to break the algorithm-based cryptography most commonly used today. Quantum Key Distribution (QKD) offers a way forward by enabling quantum-safe and future-proof encryption rooted in the randomness of quantum physics. bigQ holds internationally leading expertise in QKD based on continuous variables. This approach is particularly interesting as it is readily compatible with existing telecom infrastructures. In early 2022, a team of researchers from bigQ, lead by Tobias Gehring, successfully carried through the first field demonstration of QKD in the Nordics together with collaborators from Danske Bank and KPMG. Later in the year, DTU was appointed as coordinator of the national Danish contribution to the European Quantum Communication Infrastructure (EuroQCI) and this was successfully translated into a joint national project (QCI.DK), including as partners 4 ministries, 4 universities, as well as private companies. The main task for the project is to establish a quantum-secured communication network between the participating ministries.

On March 2023, QCI.DK was kicked off at DTU where Minister Morten Bødskov gave the opening speech and saw the QKD technology being developed in bigQ's laboratories.

Connecting with the global research community

2022 was a great year for bigQ in terms of making new international connections and strengthening existing ones. The center hosted several conferences and workshops and the broad international attendance clearly showed that continuous variable quantum optics is a field gaining more and more support on a global scale both in terms of basic research and development of quantum technologies. As witnessed by the number of new projects that bigQ has attracted in both domains, the center is a very attractive collaborator.

Figure 1: *(left) bigQ Symposium on Quantum Information Science, Carlsberg Academy, April 27-28, (middle) Workshop on Continuous-Variable Photonic Quantum Computing, Hotel Scandic Falkoner, December 14-16, (right) Workshop on Continuous-Variable Quantum Correlations, Carlberg Academy, September 6-8.*